FINDING OF NO SIGNIFICANT IMPACT/
DECISION RECORD

FINDING OF NO SIGNIFICANT IMPACT

After studying the potential impacts of the proposed action as described in the Pecos River Grassland Restoration Environmental Assessment and after careful consideration of public comments received, I do not anticipate any significant impacts on the quality of the human environment. I base my finding of no significant impacts on the factors related to context and intensity of impacts as defined by the Council on Environmental Quality (CEQ) at 40 CFR, parts 1500-1508. I conclude that the implementation of the proposed action would not result in any undue or unnecessary environmental degradation and an Environmental Impact Statement is not required.

DECISION

It is my decision to approve the Turkey Track Grassland Restoration Project as described in the Proposed Action in the attached environmental assessment (EA No. NM-510-2006-182). The mitigation measures identified in the attached EA (section IV, E. Mitigation Measures) along with specific project design features relative to vegetative treatments on public lands have been formulated into stipulations. This decision incorporates, by reference, those stipulations identified in the attached Environmental Assessment.

RATIONALE FOR DECISION

Approval of the Proposed Action is the most economical and environmentally acceptable method of restoring the desired desert grassland communities, reducing dead and decadent fuel loadings, and reducing desert brush encroachment in the Pecos River Grassland Restoration Project area. Consequently, watershed functions, soil stabilization, wildlife habitat and livestock management will be improved. This action will authorize treatment of up to 91,000 public land acres by the use of prescribed fire, mechanical, manual extraction and/or herbicides in the project area for the purpose of meeting specific desired plant community objectives and improving vegetative composition for rangeland health considerations. The proposed action is limited to the upland sites where targeted brush species have exceeded the threshold of desired density and composition. Floodplains, as well as wetlands and riparian zones would not be treated and would be buffered out of treatment areas.

The Proposed Action is in conformance with the Roswell Resource Management Plan and the Fire and Fuels Management Plan Amendment for Public Lands in New Mexico and Texas. The treatments will be conducted when the windows are appropriate to safely meet treatment objectives. These types of treatments are expected to benefit many wildlife species, as well as restore and promote watershed functionality.

If you wish to protest this proposed decision in accordance with 43 CFR 4160.2, you are allowed 15 days from receipt of this notice within which to file a protest with the Field Manager, Bureau of Land Management, 2909 West 2nd, Roswell, NM 88201. This protest should specify, clearly and concisely, why you think the proposed action is in error.

If a protest is filed within the time allowed, the protest statement of reasons and other pertinent information will be considered and a final decision will be issued with the right to appeal (43 CFR 4160.3 (b) and 4160.4).

In the absence of a protest within the time allowed, the above decision shall constitute my final decision. Should this notice become the final decision, you are allowed an additional 30 days within which to file an appeal for the purpose of a hearing before an Administrative Law Judge, and to petition for stay of the decision pending final determination on the appeal (43 CFR 4.21, 4.470 and 4160.3 (c)). If a petition for stay is not requested and granted, the decision will be put into effect following the 30-day appeal period. The appeal and petition for stay should be filed with the Field Manager at the above address. The appeal should specify, clearly and concisely, why you think the decision is in error. The petition for stay should specify how you will be harmed if the stay is not granted.

/s/Larry D. Bray 1/8/2007

Larry D. Bray, Acting Roswell Field Manager Date

Bureau of Land Management, Roswell Field Office
Environmental Assessment Checklist, EA# NM-510-2006-182

Resources	Not Present on Site	No Impacts	May Be Impacts *	Mitigation Included	BLM Reviewer	Date
CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT						
Air Quality			X		Hydrologist	
Floodplains	X				/s/ Michael McGee	10/5/06
Water Quality - Surface/Ground			X X	 X	Geologist /s/ John S. Simitz Hydrologist /s/ Michael McGee	10/5/06
Cultural Resources			X		Archaeologist	
Native American Religious Concerns		X			Pat Flanary	9/27/06
Environmental Justice		X			/s/J H Parman	
Areas of Critical Environmental Concern	X				Plan & Env. Coord.	8/29/06
Farmlands, Prime or Unique		x			Realty Irene M. Gonzales	9-13-06
Invasive, Non-native Species			X	X	Range Mgmt. Spec. **HCJMiller**	09/12/06
Wastes, Hazardous or Solid	X				/s/J H Parman Haz. Mat Spec	10/17/06
Threatened or Endangered Species	X				Biologist	
Wetlands/Riparian Zones	X				/s/Melvin Moe	9/1/06
Wild and Scenic Rivers	X				Outdoor Rec. Plnr.	
Wilderness	X				***Paul Happel***	9/5/06
NON-CRITICAL ELEMENTS						
General Topography/Surface Geology		X			Sur .Prot. Spec. Richard G. Hill	10/18/06
Solid Mineral Resources		√			Geo/SPS /s/ Jerry Dutchover	10/18/06
Fluid Mineral Resources		X			Pet Engr/Geo /s/ John S. Simitz	10/18/06
Paleontology		X			Archaeology Pat Flanary	9/27/06
Soil			X	X	Hydrologist	
Watershed/Hydrology			X	X	/s/ Michael McGee	10/5/06
Vegetation			x		John Spain, Range Mgmt . Spec.	9/25/06
Livestock Grazing			x			
Special Status Species			X		Biologist	
Wildlife			X		/s/Melvin Moe	9/1/06
Recreation			X		Outdoor Rec. Plnr.	
Visual Resources			X		***PAUL HAPPEL***	9/5/06
Cave/Karst			X			
Fire and Fuels					Fire Mgmt Officer Allan J Wyngaert Act.	10/3/06

Environmental Analysis

Turkey Track Grassland Restoration Project

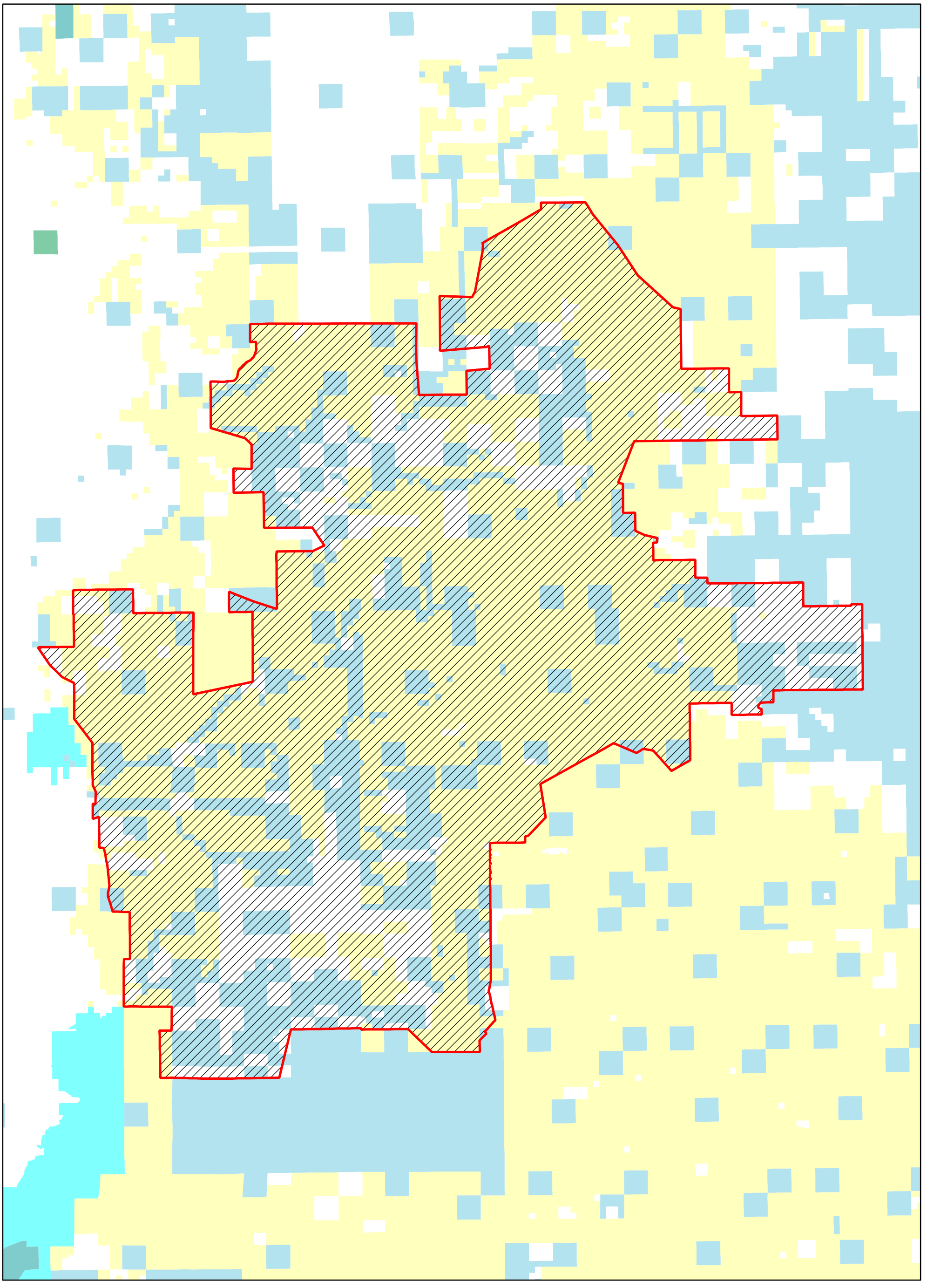
NM-510-2006-182

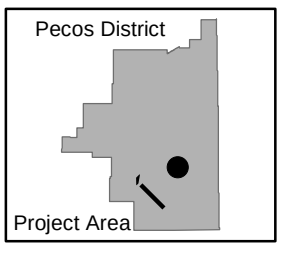
Bureau of Land Management
Roswell Field Office
Roswell, New Mexico

December 12, 2006

Location:
Allotment #65075

TURKEY TRACK GRASSLAND RESTORATION





PUBLIC

STATE

PRIVATE

SGF

TURKEY TRACK ALLOTMENT AND PROJECT AREA

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other date. Original data was compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

Produced by the RFO GIS Specialist on Sept. 13, 2006.

Environmental Analysis
Turkey Track Grassland Restoration Project

NM-510-2006-182

Bureau of Land Management
Roswell Field Office
Roswell, New Mexico

I. INTRODUCTION

Purpose and Need for the Proposed Action

The purpose of this environmental assessment is to analyze the impacts of projects within the Turkey Track Ranch, Allotment #65075, designed to meet the goals of the desired plant community and to restore the rangeland ecosystem to closely match its historical structure, function, diversity, and dynamics. Specific projects include reducing the amount of creosote and mesquite within the treatment areas (see map).

The Turkey Track Grassland Restoration Project is needed because vegetation in portions of the allotment has shifted from desert grassland with scattered shrubs to a vegetation community that is shrub dominated with a decrease in the herbaceous component and an increase in the amount of bare ground. The increase in shrubs has resulted in an increase in dead and down fuel loadings and a decrease in the understory component. This change has resulted in an increase susceptibility to drought, accelerated erosion, a decrease in biodiversity, and a decrease in the quality of habitats.

Conformance with Land Use Plans: The proposed activity is addressed as part of the Roswell Resource Management Plan (October, 1997).

Relationship to Statues, Regulations or Other Plans: The proposal to implement a vegetation treatment on mesquite (*Prosopis glandulosa* or *P. jugans*) and creosote (*Larrea tridentata*) is consistent with and tiered to the New Mexico Record of Decision dated July, 1991, for the Vegetation Treatment on BLM Lands in Thirteen States Final EIS (FEIS) of May 1991; 1994 Environmental Impact Statement for Rangeland Reform; the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1700 et seq.); the Taylor Grazing Act of 1934 (TGA) (43 U.S.C. 315 et seq.); the Public Rangelands Improvement Act of 1978 (PRIA) (43 U.S.C. 1901 et seq.); the Federal Noxious Weed Act of 1974 (7 U.S.C. 2801-2813), as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990; and the Carson-Foley Act of 1968 (P.L. 90-583).

II. PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action

The proposed treatment area is located in southeastern Chaves County northeastern Eddy County (see attached map). Acres proposed for treatment in the Turkey Track

Grassland Restoration Project can be found in Table 1. The project area for the Turkey Track Grassland Restoration Project contains approximately 400,000 acres with 229,000 acres of public land. Of this total, approximately 115,000 acres or 50 percent of the public land within the project area is proposed to be treated.

The goal of the proposed action is to restore overall rangeland health and watershed functionality through the use of chemical, prescribed fire, and mechanical extractor treatments in those areas where the vegetative composition and production levels are no longer meeting desired plant community objectives. To accomplish this goal, the proposed action would concentrate treatments on areas that possess one or more of the following characteristics:

1. the vegetative community is at a level of 60% or greater departure from potential for the site,
2. the mesquite component of shrubs meet or exceed one-third of the total percent of shrub cover,
3. the creosote bush component of shrubs meets or exceeds 20 percent of the vegetative canopy,
4. the specific upland community is not currently meeting one or more rangeland health standards and,
5. the treatment would have no negative impact on non-target plant or animal components of the community.

Table 1. Ownership Acres Within the Turkey Track

Acres Within Turkey Track (all owners)	Acres of Public Land Within Turkey Track	Upper Limit of Acres of Public Land to be Treated	Percent of Turkey Track to be Treated	Percent of Field Office Public Land to be Treated
400,000	229,000	115,000	29%	8%

To reduce mesquite within the project area, herbicide treatments would consist of the application of triclopyr and clopyralid or an approved alternate herbicide by aerial application on public land. The liquid herbicides triclopyr (Reclaim) and clopyralid (Remedy) would be applied at a rate of about 0.25 pound of active ingredient each per acre to the areas that are dominated by mesquite or meet the criteria listed above. See Appendix A for the label information and appropriate application requirements for triclopyr and clopyralid. The herbicides would be aerially applied in the spring and early summer (April through July). Small blocks in inclusions of mesquite may also be considered for treatment by backpack or truck mounted application equipment. The occurrence of mesquite in the project area does not overlap the occurrences of other target species. Therefore, triclopyr and clopyralid would be applied at the above rate to reduce only mesquite and not other target species.

To reduce creosote within the project area, herbicide treatment would consist of the application of pelletized tebuthiuron or an approved alternate herbicide by aerial application on acres of public land. Application rates for the herbicide would be 0.5 pounds of active ingredient per acre of tebuthiuron. See Appendix A for the label information and appropriate application requirements for tebuthiuron. Application of the herbicide would occur between the first of June and the end of following February;

avoiding the nesting season for local quail *(Callipepla* spp.). Small blocks in inclusions of creosote may also be considered for treatment by backpack or truck mounted application equipment. The occurrence of creosote in the project area does not overlap the occurrences of other target species. Therefore, tebuthiuron would be applied at the above rate to reduce only creosote and not other target species.

The following measures would be applied to aerial herbicide applications within the project area:

a. Irregular boundaries for maximizing edge effect would be incorporated into all methods of treatment. Undisturbed islands of natural vegetation would be left, where appropriate, to minimize negative impacts to wildlife. Additional islands of untreated vegetation would be left as needed to create or maintain the mosaic pattern that provides suitable habitat for such species as scaled quail and loggerhead shrikes. The leave out areas would be equal to or greater than 15% of the total proposed treatment area.
b. All livestock would be removed from treated pastures prior to aerial spraying or ground applications involving foliar spray. Livestock should be removed after the first 1/2 inch of moisture following pellet treatment. Herbicide label requirements would be met when grazing domestic animals after application. Livestock grazing would be removed prior to treatment and then deferred for a minimum of two consecutive growing seasons after treatment. The growing season usually begins at the onset of the summer rains (July 1) and continues until first frost (October 31). Livestock numbers would not increase as a result of treatment.
c. Livestock grazing management, using the best management practices associated with the New Mexico Guidelines, would follow all treatments to ensure that the objectives for Healthy Public Land are not compromised.
d. Potential treatment areas would be reviewed by a BLM biologist to determine if these treatment areas contain suitable sand dune lizard (*Scleroporus arenicola*) habitat or suitable lesser prairie-chicken (*Tympanuchus pallidicinctus*). Suitable habitat for both species contains shinnery oak (*Quercus harvardii*). Areas containing shinnery oak would be removed from consideration of treatment with tebuthiuron.
e. Floodplains as well as wetlands and riparian zones would not be treated and would be buffered out of treatment areas. (See Appendix 9, Treating Vegetation with Herbicides, of the 1997 Roswell RMP, for a description of buffers around rivers, floodplains and riparian areas.)
f. Monitoring studies would be conducted to determine those areas that meet or exceed the treatment threshold. Post-treatment monitoring would be conducted to evaluate the effectiveness of treatments.

Management treatments and project design features relating to vegetation treatment (creosotebush and mesquite) activities are presented in the1991 Vegetation Treatment FEIS pages 1-33 to 1-35,. All mitigation measures adopted in the Record of Decision for the FEIS are incorporated as additional project design features.

The requirement that no new treatments completed adjacent to an existing treatment until five years have passed (see page 33, 1997 Roswell RMP) would be dropped in

order to offer more management flexibility on a landscape and watershed basis. See Appendix B, Best Management Practices for Vegetation Treatments.

Prescribed fire could be applied to the treated area as a secondary treatment to remove dead vegetation left standing as a result of the chemical application and any sprouting of the target species. Spring (April to late June) would be the preferred time of year for conducting the prescribed fire projects as this is when most natural-caused (i.e. lightning) fires occur; however, the prescribed fire projects may be implemented any time of the year the fuel and weather conditions are appropriate to safely meet the objectives for the proposed action. The use of prescribed fire would be considered when:

a. Fuel loading in a prospective treatment area is such that fire would effectively reduce the amount of mesquite to one-third or less of the total percent of shrub cover or reduce the amount of creosote to less than 20 percent of the vegetative canopy.
b. Existing herbaceous vegetation in a prospective treatment area is adequate to effectively carry and support ignition attempts.
c. A reasonable treatment window would result from the prescribed fire parameters for effective mesquite treatment.
d. The risk of an escaped prescribed fire is minimal.

All prescribed fires would be conducted under a site specific Prescribed Fire Burn Plan as per BLM Manual 9214. The Prescribed Fire Burn Plan would specify the weather and fuel conditions, fire behavior, holding resources, and prep work (i.e. sites to be protected, line construction) needed to safely and efficiently meet the objectives for the project. The Prescribed Fire Burn Plan would identify any persons and agencies to be notified concerning the prescribed fire project. The Prescribed Fire Burn Plan would also identify any potential receptor sites and smoke management mitigation measures necessary to minimize impacts to the airshed and receptor sites.

Prescribed fire control lines would utilize natural barriers (i.e. rock outcrops, bare ground), bladed roads and two-tracks when possible to avoid creating new surface disturbance. There would possibly be areas where control lines would have to be constructed using heavy equipment. Before implementing this phase of the proposed action, the appropriate level of cultural resources inventory would be determined by following the procedures described in the “Protocol Agreement between the New Mexico Bureau of Land Management and New Mexico State Historic Preservation Officer” (June 2004) or successor documents (the Protocol Agreement). The following measures would apply to all prescribed burn treatments within the project area:

a. Range improvement projects (pipelines, fences) would be excluded from fire when possible. Oil and gas related infrastructure would also be protected from fire. Power lines and communication lines would be excluded as well.
b. A minimum of two growing seasons would occur prior to areas being augmented with prescribed fire.
c. Livestock would be removed prior to treatment. Treatment areas would be deferred from livestock grazing for at least two consecutive growing seasons following treatment. The growing season usually begins at the onset of the

summer rains (July 1) and continues until first frost (October 31). Livestock numbers would not increase as a result of treatment.

Mechanical extractors grasp the plant by the stem and pull the plant out of the ground with the bulk of the roots still attached. This treatment method would be used in those areas where chemical or prescribed fire treatments would be inappropriate due to other resource concerns such as wildlife habitat. The following protection measures would apply to all extractor treatments within the project area:

a. Treatment areas would be confined to those areas where aerial herbicide application is inappropriate due to proximity to lesser prairie-chicken leks.
b. Treatment would be scheduled for the time of year to produce the least disturbance to mating, nesting and brood-rearing in life cycle of the lesser prairie-chicken
c. Vegetative debris would be piled or left in windrows for burning during a time of year that produces the least disturbance to mating, nesting and brood-rearing in life cycle of the lesser prairie-chicken.

B. Alternative A – Manual Treatment

Hand-operated power tools and hand tools would be used to cut and clear the treatment area of creosote and mesquite. Workers would cut plants at ground level and pull, grub or dig out root systems to prevent sprouting and regrowth. Tools to be used would include hand saws, axes, grub hoes, hand pruners and chain saws. All materials removed would require hand piling and burning at a later date. Rest periods from livestock grazing would also apply to these types of treatments.

C. Alternative B – Large Scale Mechanical Treatment

Wheeled or crawler-type tractors would be used to grub out creosote and mesquite in the treatment area. Tractors would be confined to working on slopes of less than 30 percent. Vegetative debris would be piled or left in windrows for reduction by burning. Rest periods from livestock grazing would also apply to these types of treatments.

D. No Action Alternative

No treatment would be conducted to reduce the amount of creosote and mesquite in the treatment area.

E. Alternatives Considered But Not Analyzed

Biological Treatment – Currently BLM is not aware of any specific effective biological control for creosote or mesquite. Therefore, biological treatments as a primary control for mesquite and creosote will not be analyzed.

Prescribed Fire alone – Fires are more effective on non-sprouting shrubs such as sagebrush than on re-sprouting shrubs such as creosote and mesquite (Holechek, et al. 2001). Likely fire would not eliminate creosote or mesquite as they sprout following low to moderate severity fires. Prescriptions to generate fire intensity severe enough to kill

root crowns of mesquite and creosote would likely pose an unacceptable risk of fire escaping the control boundaries. Therefore, prescribed fire treatments as a primary control for creosote or mesquite will not be analyzed.

Treatment with other chemical – There are other chemicals on BLM's list of approved herbicides that could be used to control creosote. A partial list of these chemicals include clopyralid, 2,4-D, dicamba, glyphosate, hexazinone, picloram, and triclopyr. BLM rejected their use due to impacts to non-target vegetation and/or increased impacts to soil or water resources. Therefore, the use of these chemicals as a primary control for creosote will not be analyzed.

Higher rates of tebuthiuron than those proposed for creosote could also be used to treat mesquite. However, BLM has rejected the higher rate of tebuthiuron (2 to 4 lb active ingredient/acre) due to adverse impacts to other desirable shrubs, forbs and grasses. Other approved chemicals could be used to treat mesquite, such as 2,4-D, dicamba, glyphosate, hexazinone, and picloram, however, the combination of Triclopyr and Clopyralid, applied at 0.25 lbs/ active ingredient per acre each, has been found to be the most effective with the least amount of adverse impacts to more desirable shrub species.

No livestock grazing – This alternative was previously analyzed in the 1994 Range Reform EIS. The 1997 Roswell RMP determined the public land within the project area as suitable for livestock grazing. Therefore, a no-livestock grazing alternative will not be analyzed.

III. AFFECTED ENVIRONMENT

A. General Setting

The proposed treatment areas are located within the Turkey Track Ranch, Allotment #65075. The area is physically located approximately 17 miles northeast of Artesia. This allotment totals 393,659 acres of which 229,406 are public land, 99,405 are State Land and 64,848 are controlled private land. The affected environment of the area is generally discussed in the Roswell Resource Management Plan (RMP). Refer to this plan and the following for a complete description (Chapter 2). Only those resources actually impacted by the proposed action would be addressed in this document.

Both the surface and mineral estates are in public ownership. An inspection of the Master Title Plats revealed the following title information:

Oil and Gas Leases: There are approximately 1,020 oil & gas leases filed with BLM in the area proposed for this project, as of August 31, 2006.

There are no existing mining claims filed with BLM in the area proposed for this project, as of August 31, 2006.

The regional uses are ranching, along with seasonal hunting and recreation.

The critical elements of Area of Critical Environmental Concern's, Prime or Unique Farmlands, Floodplains, Native American Religious Concerns, Hazardous or Solid Wastes, Wetland and Riparian Zones, Wild and Scenic Rivers, and Wilderness are not present within the treatment area and would not be affected.

B. Affected Resources:

Air Quality: The most significant impacts on air quality would be moderate noise and minimal chemical drift from aerial application of the herbicide. Impacts would be temporary, small in scale, and quickly dispersed throughout the area. These factors, combined with standard management practices (stipulations), minimize the significance of potential impacts. Federal, State, and local air quality regulations would not be violated. Standard management practices for aerial application of herbicides would limit the amount of drift into non-target areas.

The use of aircraft to apply the herbicides could temporarily cause noise levels to reach 90 dbA; however, no long-term effects are anticipated. The chemical nature of the herbicide is such that no residue would be left in the soil or atmosphere after approximately 3 years.

The analysis area is within the Pecos River airshed and is classified as a Class II Air Quality Area. The class II rating allows for moderate development or slight degradation of air quality. The Pecos River airshed is classified as an attainment area which means federal air quality standards are being met. Air quality is generally considered good to excellent. Intermittent dust storms that generate airborne particulate materials are the primary source of air pollution in the area, but are not of adequate frequency or duration to detract from the overall condition of the airshed.

The secondary treatment with prescribed fire would have an immediate, but short term impact on air quality in the immediate area. The burn out time for grasses is usually less than 60 minutes. Using smoke emission models, the total suspended particulate would be approximately 0.41 tons.

Soil: The project area is predominately the Kimbrough association, the Roswell-Faskin-Jalmar association; the Berino-Pintura-Pajarito association and the Tencee-Simona-Sotim association within Chaves County. In Eddy County the soil is Reeves-Gypsum land-Cotton association, the Kimbrough-Stegall association, the Kermit-Berino association, the Simona-Pajarito association and the Arno-Harkey-Anthony association.

Water Quality*:* Herbicides applied to the land may enter surface or ground water. Herbicide use also may produce minor increases in stream nutrients, stormflows, and sediment yields.

Surface Water: The proposed treatment area is located in the Pecos Basin of New Mexico. There are no perennial streams, rivers or riparian areas in the area proposed for treatment.

Ground Water: The project area is in the Roswell Ground Water Basin. The depth to shallow unconfined groundwater varies from 1 foot to depths of 100 feet throughout the Planning Area (New Mexico Office of the State Engineer data).

Recreation: There would be no direct or indirect impacts to recreation.

Off Highway Vehicle designation for public land within this allotment are classified as "Limited" to existing roads and trails.

Cave/Karst: The project area is located in an area of medium and low cave/karst potential and no karst features or significant caves are found in the vicinity of the proposed treatment area.

Visual Resource Management: The area is considered to contain both Class III and IV Visual Resource Management Areas (VRM). In a Class III VRM, contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes should remain subordinate to the existing landscape. In a Class IV VRM, contrasts may attract attention and be a dominant feature in the landscape in terms of scale, however, the changes should repeat the basic elements of the landscape.

Vegetation: The area is predominately grass covered with a mixed overstory of creosote and mesquite, and falls predominately into the Grassland or Mixed Desert Shrub Communities. An additional area within the allotment falls into the Shinnery Oak Dune Community. Descriptions of these communities may be found in the Roswell Resource Management Plan, Pages 2-45 to 2-49.

Other shrubs which are potentially found in either the Mixed Desert Shrub or Grassland communities include catclaw mimosa (*Mimosa biuncifera*), apache plume (*Fallugia paradoxia*), cholla (*Opuntia imbricata*.), sotol (*Dasylirion leiophyllum*), winterfat (*Eurotia lanata*), wolfberry (*Lycium berlandieri*), threadleaf groundsel (*Senecio longilobus*), mountain mahogany (*Cercocarpus montanus*), dalea species (*Dalea spp*.), sumac species (*Rhus spp*.), juniper (*Juniperus spp*.), oak species (*Quercus spp*.), Bigelow sagebrush (*Artemisia bigelovii*), four-wing saltbush (*Atriplex canescens*), yerba-de pasmo (*Baccharis pteronioides*), ephedra species (*Ephedra spp*.), range ratany (*Krameria glandulosa*), javelinabush (*Condalia ericoides*) and creosote; all contributing a total of approximately 2 to 10% of the vegetative production.

Using the DPC descriptions for RFO, the three major vegetative communities within the project area are the grassland community, shinnery oak-dune community, and the mixed desert shrub community. The grassland and shinnery oak - dune communities make up the largest portion of the project area. The grassland community can be broken down into several subtypes, with the grass rolling upland and mesquite grassland types being the most common.

Within the project area, the field office has over 20 years of rangeland monitoring data collected at permanently established study plots. This data provides information about range condition, amount of annual vegetative production, composition and cover of vegetation, utilization amounts, and precipitation. In general terms, this data indicates

that range condition is in the high fair to low good class and trend data is static to slightly upward. When the vegetative composition monitoring data for the project area is summarized in terms of DPC, the grass component falls within the objectives, the forb component is low, and the shrub component is high. This is expressed numerically as:

Grassland Community

DPC	Grasses 30-85%	Forbs 10-15%	Shrubs/Trees 1-10%
Monitoring	Grasses 60.7%	Forbs 10.9%	Shrubs/Trees 29.2%

Shinnery Oak-Dune Community

DPC	Grasses 50-70%	Forbs 10-15%	Shrubs/Trees 25-40%
Monitoring	Grasses 27.2%	Forbs 7%	Shrubs/Trees 55.9%

Mixed Desert Shrub Community

DPC	Grasses 55-75%	Forbs 10-20%	Shrubs/Trees 15-20%
Monitoring	Grasses 48.9%	Forbs 6.7%	Shrubs/Trees 44.2%

Invasive, Non-native Species: The project area includes small populations of African rue (*Peganum harmala*), generally along roads and on scattered caliche pads. The populations may have gotten their starts from seeds brought in on heavy equipment being moved from infested sites. Small inclusions of salt cedar (*Tamarix* spp.) also may be found along draws, dirt tanks and waterways.

Wildlife: The project area provides habitat for a wide variety of wildlife. Mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana),* lesser prairie chicken, scaled quail (*Callipépla squamáta*), mourning dove (*Zenáida macroúra*), and sand dune lizard are some of the more notable species, but many other birds, mammals, reptiles and amphibians are also found here.

Special Status Species: This project area contains habitat for the lesser prairie-chicken and the sand dune lizard. The US Fish & Wildlife Service has determined both species are warranted for listing as threatened or endangered but precluded from listing due to higher priorities.

Livestock: Turkey Track allotment #65075 is permitted to run 4529 cattle and 58 horses for a total of 28,623 Animal Unit Months on this allotment yearlong.

IV. ENVIRONMENTAL IMPACTS

The actions described in Section II of this assessment that would cause environmental impacts are presented in Chapter 3 and summarized in Table 1-9 (Alternative 1) of the 1991 Vegetation Treatment FEIS. Analysis discussions in that FEIS have no impact of importance upon the following resources; climate, topography, minerals, utilities, communication sites and energy use.

A. Impacts of the Proposed Action

No impacts have been identified that exceed those addressed in the 1991 Vegetation

Treatment FEIS. The following are impacts of importance based upon site specific analysis of the proposal.

Air: The most significant impacts on air quality would be moderate noise and the potential for minimal chemical drift from aerial application of the herbicide. Impacts would be temporary, small in scale, and quickly dispersed throughout the area. These factors, combined with standard management practices (stipulations), minimize the significance of potential impacts. Federal, State, and local air quality regulations would not be violated. Standard management practices for aerial application of herbicides would limit the amount of drift into non-target areas.

As tebuthiuron is pelletized, droplet size and drift of liquid herbicide is not a factor. The use of aircraft to apply the herbicides could temporarily cause noise levels to reach 90 dbA; however, no long-term effects are anticipated. The chemical nature of the herbicide is such that no residue would be left in the soil or atmosphere after approximately 3 years.

The use of aircraft to apply the triclopyr and clopyralid to control mesquite could temporarily cause noise levels to reach 90 dbA; however, no long-term effects are anticipated. The chemical nature of the herbicide is such that no residue would be left in the soil or atmosphere after approximately 3 years.

The analysis area is within the Pecos River airshed and is classified as a Class II Air Quality Area. The class II rating allows for moderate development or slight degradation of air quality. The Pecos River airshed is classified as an attainment area which means federal air quality standards are being met. Air quality is generally considered good to excellent. Intermittent dust storms that generate airborne particulate materials are the primary source of air pollution in the area, but are not of adequate frequency or duration to detract from the overall condition of the airshed.

The secondary treatment with prescribed fire would have an immediate, but short term impact on air quality in the immediate area. The burn out time for grasses is usually less than 60 minutes. Using smoke emission models, the total suspended particulate would be approximately 0.41 tons.

Soil: Vegetation treatments may affect the physical characteristics of soil directly, alter the abundance and types of vegetation that may shield it from erosion, or alter the presence and abundance of microorganisms or larger organisms that contribute to overall soil quality.

Granular formulations of herbicides such as tebuthiuron release the herbicide into the soil plant root zone with subsequent chemical uptake and absorption by the targeted plants. Triclopyr and clopyralid are liquid formulations that are applied onto the foliage of the mesquite. Whether the herbicide is aerially applied or by truck-mounted and backpack units, some of the herbicide is deposited onto the soil. Removal of solid stands of vegetation by chemical treatment may result in short-term, insignificant increases in surface erosion that would diminish as vegetation reoccupies the treated site. The speed of site revegetation and the plant composition of the new vegetation depends on climate and the persistence and selectivity of the herbicide. Table 3-3 of the

1991 Vegetation Treatment FEIS (page 3-23) gives a general description of vegetation susceptibility of herbicides. Clopyalid is considered to be “Selective, . Many broadleaf annual and perennial weeds and woody plants are susceptible are susceptible”, and Triclopyr is considered to be “Selective. Woody plants, broadleaf weeds, and root-sprouting species are susceptible.”

Although herbicides would not alter a soil’s physical properties, there may be indirect effects on microorganisms. Depending on the application rate and the soil environment, herbicides can either stimulate or inhibit soil organisms. When herbicide-treated vegetation decomposes, the resulting addition of organic matter to the soil can support increased populations of microorganisms. Soil microorganisms can metabolize herbicides and often are reported to be responsible for herbicide decomposition (Norris and Moore, 1981). However, certain herbicides may inhibit microorganism growth or may produce more toxic effects and increase microorganism mortality rates.

The effects of the proposed action on the soil would be substantial. The increased organic matter, caused initially by the mesquite or creosote leaves, stems and roots and secondarily by the increased production of grasses and forbs would improve the fertility of the soils.

Prescribed burning may increase the erosion potential until the perennial vegetation reestablishes. Extremely intense fires would cause a higher than desired mortality on all plant species, resulting in the exposure of excess amounts of bare ground over a longer period of time and, consequently, greater soil loss. However, extremely intense burning would be avoided by burning within favorable prescriptions. Because fibrous rooted perennial grass species increase soil stability, soil erosion would be reduced below present levels when grasses become re-established.

Burning increases nutrient cycling by releasing nutrients that had been tied up in litter and plant material back into the soil. Soil temperatures of burned areas are usually higher than those of adjoining unburned areas. This is part of the reason that burned areas typically green-up earlier than unburned adjoining areas.

The competition for water and nutrients would be decreased as the treatment takes effect. Grasses and herbaceous plants may be affected by the treatment during the first year. An increase in ground cover (grasses and forbs) is expected by the second growing season. This ground cover would help minimize erosion and increase infiltration of the surface water. Some soil micro-organisms may be negatively impacted for the short term duration of the treatment. Microbial activity is expected to resume at present levels once dispersion of the chemical is complete.

Water: Herbicides applied to the land may enter surface or ground water. Herbicide use also may produce minor increases in stream nutrients, stormflows, and sediment yields.

Surface Water Impacts: Entry of herbicides into surface water is discussed in the risk assessment (Appendix E of the 1991 Vegetation Treatment FEIS). Herbicides may enter surface water during treatment through accidental direct application or drift, or after treatment through surface or subsurface runoff. To pollute the water, herbicides must be

present in the water at concentrations high enough to impair water quality at point of use.

Buffer zones reduce drift impacts on sensitive areas, while wind increases drift impacts. Mitigation requires buffer of 100 feet (aerial). After treatment, herbicides may enter streams by subsurface flow or by movement in ephemeral channels. Key factors that would affect peak concentration include the presence of buffers, storm size, herbicide properties, soil properties, and downstream mixing and dilution.

Large storms rarely produce high concentration because herbicides are diluted by large water volumes, while small storms may not produce enough flow to move herbicides into streams. Intermediate storms often produce higher concentrations of pesticides in streams relative to the other two situations because of the resulting streamflow is sufficient to mobilize the herbicides but not large enough to substantially dilute the material.

The amount of herbicide available for movement from the site of application with surface or infiltrating water would be determined, in part by the herbicides persistence. Herbicide persistence is usually expressed in terms of “half-life”. This is the typical length of time needed for one-half of the total amount applied to break down to substances that are no longer of toxicological concern. While a herbicide’s soil half-life in practice is influenced by local conditions such as soil type and climate, it is useful for describing the relative rates at which various herbicides are broken down in the soil.

Sunlight, temperature, soil and water pH, microbial activity and other edaphic characteristics may affect the breakdown of herbicides. Soil organic matter and soil properties such as moisture, temperature, aeration, and pH all affect microbial degradation. Microbial activity increases in soil that is warm, and moist with a neutral pH. In addition to microbial action, chemical degradation of herbicides can occur by reaction with water, oxygen or other chemicals in the soil. As soil pH becomes extremely acidic or alkaline, microbial activity usually decreases, however these conditions may favor rapid chemical degradation.

Table 3-6 of the 1991 Vegetation Treatment FEIS (page 3-45) gives field half-lives for the 19 herbicides proposed for use in the FEIS. Tebuthiuron has a soil half-life of 360 days (with a range of reported half-life of 13 to 450 days) and is considered to be a “persistent herbicide”. Persistent herbicides are those with typical half-lives in excess of 100 days**.** Triclopyr has a soil half-life of 46 days (with a range of reported half-life of 30 to 90 days) and is considered to be a “moderately persistent herbicide”. Clopyralid has a soil half-life of 30 days (with a range of reported half-life of 12 to 70 days) and is considered to be a “moderately persistent herbicide”. Persistent herbicides are those with typical half-lives in excess of 100 days**.** These values are considered most representative of the values reported in the literature, as the rate of degradation by natural processes is not only dependent on the herbicide chemistry, but also environmental factors.

In addition to degradation, these herbicides may be unavailable for movement with surface or infiltration water due to volatilization and plant uptake. Volatilization is the loss of herbicide vapor to the atmosphere from plant and soil surfaces. The rate of

volatilization is determined by the herbicide's vapor pressure and how strongly it is adsorbed. Vapor pressures for the herbicides proposed for use in the 1991 Vegetation Treatment FEIS are given in Table 3-6 (page 3-45).

The vapor pressure for tebuthiuron is 2.0 x 10-6 mm HG\g. The vapor pressure for triclopyr is 1.3 x 10-6 mm HG\g. The vapor pressure for clopyralid is 0 mm HG\g. The higher the vapor pressure the greater the potential for loss due to volatilization. Also, higher temperature usually results in increased volatilization. The degree of plant uptake is partially determined by the herbicide's water solubility. The more water soluble an herbicide is, the greater the possibility for plant uptake.

Soil adsorption is also important in determining mobility in surface or infiltrating water. Adsorption of a herbicide varies with the properties of the chemical, as well as the soil's texture (relative proportions of sand, silt, and clay), moisture level, and amount of organic matter. Soil high in organic matter of clay tend to be the most adsorptive, and sandy soils low in organic matter least adsorptive. Therefore, the higher the organic matter content of the soils, the more adsorptive the soil and the less likely the herbicide is to move from the point of application.

The degree of herbicide adsorption is often represented by the ratio of the amount of herbicide in the soil water to the amount adsorbed. This ratio is called the adsorption coefficient or Kd. The degree of adsorption depends on both the herbicide and the soil properties. The Kd for a herbicide is soil specific and would vary with soil texture and organic matter content.

Another herbicide adsorption coefficient, which is less soil specific is called the Koc. The Koc is the Kd divided by the percent of organic carbon in the soil, a major component of soil organic matter. The higher the value for Kd or Koc, the greater the adsorption. Water solubility and Koc values for herbicides proposed for use in the FEIS are given in Table 3-6 of the FEIS (page 3-45 of the FEIS). The Koc for tebuthiuron is 80 ml/g (pH=7). The Koc for Clopyralid is 6 ml/g and is 780 ml/g for triclopyr.

Impacts to surface water as the result of prescribed burning would be short-term (less than 3 years) and would take the form of increased sediment loading due to storm run-off. Impacts would be expected to be less after the first full growing season and diminish over time.

Ground Water Impacts: After treatment, herbicides may move through the soil and into underlying ground-water aquifers by leaching. Herbicide mobility and persistence greatly affect potential for leaching. To pollute ground water, they must then move laterally at concentrations high enough to impair water quality at a point of use. Herbicides move most easily through sand, which is the most porous soil and has the least adsorption potential. The potential for ground-water contamination increases as the depth to the water table and distance to the point of use decrease. Applied at typical rates, herbicides should never occur in ground-water supplies at concentrations exceeding a small fraction of EPA's most stringent drinking-water standards.

Mobility depends on solubility and adsorption; persistence depends on degradation mode and rate. Herbicide properties which determine the likelihood of movement with

infiltrating water and leaching index based upon the work of Goss (1988) are given in Table 3-6 of the 1991 Vegetation Treatment FEIS (page 3-45). The leaching index is a relative ranking of the 19 herbicides based upon their chemical properties only. The higher the value, the greater the potential that the herbicides would move through the soil profile with infiltrating water.

Tebuthiuron has a leaching index of 5.36. The leaching index for Clopyralid is 5.46 and the leaching index for Triclopyr is 1.84. Prediction of actual amounts of these herbicides that may reach groundwater must also consider the method and rate of application, as well as the soil characteristics and other environmental and climactic factors described above.

In response to the concern for ground water contamination, the Environmental Protection Agency developed a rating system to delineate ground water contamination vulnerability. This system, known as DRASTIC, (Aller et al. 1985) is used nationwide and identifies potentially vulnerable areas by factoring depth to water, net recharge, aquifer media, soul media, topography, impact to unsaturated zone, and gross hydraulic conductivity. Figure 2-8 of the 1991 Vegetation Treatment FEIS shows those vulnerable areas. The project area is considered to be a moderate vulnerability ($102 \leq$ varscore ≥ 142) area. A site specific DRASTIC would be completed prior to application of herbicides.

Impacts to ground water as the result of prescribed burning would be negligible because of the vegetation recovery after application.

Vegetation: Vegetation treatments would have both beneficial and adverse effects on terrestrial vegetation within the project area. Target and non-target vegetation in treated areas would be directly affected. The degree to which vegetation would be affected would depend on the types of treatment used and the number of acres treated. The overall effect of treating vegetation would be to achieve the desired successional stage, to create a more stratified age structure for wildlife habitat improvement and fuel hazard reduction, to accelerate succession for forest management, and to reduce or eliminate populations of undesirable species in noxious weed eradication programs.

Annual plants are generally more sensitive than perennial plants to chemical treatments because they have limited food storage mechanisms and annual plant populations are greatly reduced if plants are killed before producing seed. Perennials are most sensitive when exposed to herbicides during periods of active growth. Exposure to herbicides during active growth and before plants become reproductive also would have the greatest negative effect on populations of many annuals. The ability of annual or perennial plants to maintain viable seed in the soil for several years reduces their susceptibility to herbicides. Control of some woody plants on some sites may open the community to dominance by annuals (Evans and Young 1985).

Susceptibility of perennial plants to herbicides depends largely on their ability to re-sprout after aerial shoots are damaged (Table 3-3 of the 1991 Vegetation Treatment FEIS, page 3-23). Plants that have the ability to re-sprout after aerial shoot damage are generally least sensitive to herbicides. These plants are damaged most when exposed to herbicides when translocation to meristematic areas and to roots (Sosebee 1983).

This generally occurs only when soil temperatures are adequate for root activity and soil water is available. These plants are generally less susceptible to foliar-applied herbicides with limited exposure periods, such as 2, 4-D, than to soil-active herbicides, such as tebuthiuron, that persist in the soil long enough to be taken up when optimum translocation conditions occur.

Differences in active growth periods and phenology of non-target and target species that correspond to differences in sensitivity to herbicides can be used to minimize damage to non-target species.

Response of non-target species to broad-spectrum herbicides, such as glyphosate and tebuthiuron, may be highly dependent on the rate of application. Damage to non-target species is minimized if they are tolerant of these herbicides applied at rate sufficient to reduce target species.

Plants may vary greatly in their sensitivity to different herbicides (Sosebee 1983). Effectiveness of herbicides may vary with different climatic and soil conditions. Soil-applied herbicides are less effective on fine-textured soil relative to coarse-textured soil, because herbicide molecules may be adsorbed to clay colloids. Response of non-target plant species to herbicides depends not only on their susceptibility to the herbicide directly, but also on their response to a decrease of target plant species in the community.

Herbicides are mainly used to control woody species, such as mesquite, creosotebush, and snakeweed, in the southwest grassland (Martin 1975, McDaniel 1984). When these plants are successfully controlled, production of herbaceous vegetation may greatly increase (Cable 1976, McDaniel et al. 1982, Gibbens et al. 1987).

Tebuthiuron is more effective than other herbicides in controlling creosotebush, and tarbush (Jacoby et al 1982, Cox et al. 1986, Gibbens et al. 1987). However, tebuthiuron is injurious to many grasses and forbs, especially if applied during active growth (Baur 1976). Tebuthiuron treatments (0.4 lb a.e./acre) in New Mexico reduced woody vegetation and greatly increased perennial grass and annual forb production (Gibbens et al. 1987) Tebuthiuron significantly reduced brush species, including creosotebush, tarbush *(Flourensia cernua),* wolfberry, fourwing saltbush, snakeweed *(Gutierrezia sarothrae),* and mariola *(Parthenium incanum).* Perennial grass basal areas were initially reduced by treatment, but total grass production of bush muhly *(Muhlenbergia porteri),* threeawn *(Aristida* spp.) ,bristlegrass *(Setaria* spp.), alkali sacaton *(Sporobolus airoides)*, spike dropseed *(Sporobolus contractus),* and fluffgrass *(Dasyochloa pulchella)* combined was 11 times greater on the treated than untreated areas after 4 years. Perennial forbs, such as desert holly *(Perezia nana)* and hairyseed balia *(Baileya* spp.), were decreased slightly by tebuthiuron treatment. Production of annual forbs, mainly desert marigold *(Baileya multiradiata),* round leaf wild buckwheat *(Eriogonum rotundifolium)*, and Russian thistle *(Salsola iberica),* was seven times higher on the treated than the untreated area.

Control of creosotebush by tebuthiuron (0.4 to 1.3 lb. a.e./acre) allowed seeded grasses to persist and native grasses to increase on sites in Arizona and Mexico (Cox et al. 1986). Southwestern grasslands treated with moderate rates of tebuthiuron (less than

1.0 lb a.i./acre) should generally have decreased woody plant production and increased herbaceous production. Certain sensitive grass, forb and shrub species would be replaced by more tolerant species. Moderate application rates and strip treatments are recommended to minimize damage to desirable sensitive species.

Triclopyr is an auxin-type selective herbicide effective against woody plants and broadleaf weeds. The herbicide is particularly effective against root sprouting species, including ash and oaks and is used fro brush and weed control on rangelands, industrial sites, permanent grass pasture and broadleaf and aquatic weed control in rice. However, most grass species are tolerant to triclopyr.

Clopyralid is a systemic, postemergent herbicide that is effective against many species of Compositae, Fabacease, Solanaceae, and Apiaceae. It has auxin-like activity, inducing severe epinasty (downward bending of the plants parts, caused by excessive growth of the upper side) and hypertropy (a nontumorous increase in the size of the plants parts due to the enlargement without increase in number of constituent cells) of the crown and leaves. It has little or no activity against grasses or crucifers.

In summary, many species are sensitive to the rates and types of herbicides that are effective in controlling woody plants in the southwestern shrubsteppe. However, herbicidal treatment usually decreases woody plant growth and increases growth of grasses dependent upon climatic conditions. Herbaceous production initially decreases then increases after a few years as woody species die and herbaceous species recover and respond to reduced competition.

An even application of the pelletized tebuthiuron at the proposed 0.50 pounds of active ingredients would reduce the present composition of creosote bush to an estimated 5 to 10% by the second year after application. This reduction of creosotebush eliminates the competition for soil water, which is critical in sandy soils where the moisture holding capacity is quite low. The lack of competition would readily allow grass and forbs to flourish, increasing the amount of ground cover, reducing the amount of soil erosion as well as producing an abundance of livestock and wildlife forage.

The change in composition of the vegetative community would have the effect of changing the entire area of treatment from a desert shrubland habitat to a grassland habitat in a very short period of time (approximately 2 to 3 years). A change from shrubland to grassland would change the animal community to one that is representative of grassland habitats.

Prescribed fire typically does not kill southwestern grass species (Warren, et al 1999). This is because fires are usually fast moving and do not burn into the root crown. This allows the grass plants to re-sprout. Prescribed fires top kill sprouting shrubs such as mesquite and seedlings, which maintains the area as a grassland with scattered shrubs. Grass species recovery is dependent upon post-treatment precipitation, plant vigor prior to burning, relative humidity at time of burning, and post-treatment grazing pressure. Depending upon the amount of post-treatment precipitation, grasses can recover as quickly as the first growing season. Without sufficient post-treatment moisture, recovery could take several years to reach pre-treatment levels.

Livestock: The goals of rangeland treatment methods for livestock include suppressing plant species that are undesirable and/or toxic and improving forage production by controlling competing vegetation. Livestock could be affected directly by ingesting poisonous weeds and indirectly by changes in forage supply and herbicide exposure.

Chemical treatments are generally applied in a form or at such low rates that they do not affect livestock. Treatment would be applied when livestock are not in the treated pasture.

Based on the risk analysis in Appendix E-8 of the 1991 Vegetation Treatment FEIS, the estimated doses for livestock would be well below the EPA risk criterion of 1/5 LD50 for all of the program herbicides. Therefore, the risk of direct toxic effect to these animals is negligible, even assuming exposure immediately after treatment.

Using herbicides is the most efficient and effective way to control some competing vegetation and noxious weeds. However, some aerially applied herbicides also may eliminate some shrubs and trees that livestock need for shelter.

Following chemical application and prescribed burning, the treated areas would be rested from livestock grazing to allow the forage species time to produce leaves, stems and leaders which would build up root reserves. This post-treatment rest could be considered a negative impact, as alternative grazing must be located for the livestock normally using the treated area.

Invasive, Non-native Species: Neither African rue nor salt cedar would be impacted by the application rates being proposed of any of the three chemicals.

Wildlife: Wildlife species depend directly on vegetation for habitat, so any change in the vegetation of a particular plant community is likely to affect the wildlife species associated with that community. Any change in community vegetation structure or composition is likely to be favorable to certain animal species and unfavorable to others (Maser and Thomas 1983).

The key to understanding the effects of vegetation manipulation on wildlife involves an understanding of the vegetation structure, production, flowering and fruiting of the community; these characteristics relate to seasonal cover and food requirements for particular animal species and predators dependent on them. These characteristics also respond to a particular vegetation manipulation.

Plant communities on many western rangelands are no longer pristine and therefore do not support pristine populations of wildlife species. Many rangeland plant communities have alien herbaceous weeds or a high ratio of woody to herbaceous perennial vegetation than under pristine conditions. These vegetation conditions may favor certain wildlife species, such as the chukar partridge *(Alectoris chukár),* which depends on the alien annual grass, cheatgrass *(Bromus tectorum)* for food (Weaver and Haskell 1967), or they disfavor other species, such as pronghorn, which require mixed-plant communities, rather than those dominated by a few woody or herbaceous species (Yoakum 1975). In general, the greater the diversity of the plant community, the greater the diversity of the associated animal community (Gysel and Lyon 1980). Therefore, any

change in vegetation community structure or composition affects resident fish and wildlife populations.

The effects of vegetation manipulation on wildlife depend on vegetation structure, production, and phenology of the community. Because these characteristics relate to seasonal cover and food requirements for particular animal species- and the predators that depend on them- and because these characteristics respond differently to different vegetation manipulations, effects on fish and wildlife from vegetation management would be both positive and negative, depending on the species affected and the type of treatment used. Treatments that reduce runoff and sedimentation would have positive benefits for fish and aquatic wildlife and there would be shifts or changes in forage and habitat for wildlife, depending on the species.

Chemical treatments, like mechanical methods traditionally have been applied most frequently to decrease woody plant cover and increase the production of grasses. The control of broad-leafed woody plants, especially by selective herbicides, often results in the control of associated broadleaf forbs, both categories of plants contain species which may be important food for many different wildlife species.

Although most documented cases consider the effects on wildlife of vegetation treatments designed to increase grass production, chemical treatments can be selected and structured to increase and decrease other vegetation components for the benefit or exclusion of different wildlife species. These treatments can be considered tools for wildlife habitat management when vegetative responses and habitat requirements are understood. All treatments would affect some change in the existing wildlife communities, including amphibians, reptiles, and invertebrates. The end result of the treatment should be more beneficial to wildlife in general than the community and/or populations foregone by the treatment.

Aerial herbicide applications have the most significant potential for affecting wildlife. When determining the timing of herbicide applications, considerations should be given to the potential for humans to consume wildlife that have fed on herbicide-contaminated forage. The treated area could be posted to notify the public of the possible contamination, if herbicides pose any risk. Also the effect of herbicide consumption of lactating mammals or the feeding of contaminated foods to offspring must be considered. Some negative impacts can be lessened if the period of treatment avoids the bird nesting season and other critical seasons when loss of cover would be critical to wildlife; for example, during critical reproductive periods and prior to severe winter weather conditions.

Most riparian areas are crucial habitat for wildlife and no treatments are proposed. The primary practice would be for riparian areas to be buffered and protected from any impacts.

The BLM Pest Control Handbook, H-9011-1, requires buffering of domestic waters, perennial marsh areas, important fishing and recreational waters, and/or significant fish spawning, rearing and migration streams. Recommended buffers are the larger of the herbicide label recommendation or 25 horizontal feet for vehicle spraying and 100 horizontal feet for aerial spraying. The Roswell RMP (Appendix 9, Treating Vegetation

with Herbicides) also states buffers for herbicide applications: aerial spraying 100 feet, 25 feet for vehicle spraying and 10 feet for hand application for projects adjacent to the Pecos River, any livestock watering locations, ranch houses, or known locations of threatened or endangered plants. The RMP also includes requirements for protective buffer zones to be provided around important riparian or wetland habitats along streams, rivers, lakes that are not designed to be treated, and around xeroriparian areas along important dry water courses. Each of these buffering requirements has been included in the project stipulations and designs.

Chemical treatments have most frequently been applied to reduce the cover of woody species, such as mesquite (Martin 1975). Although research has described the life history and habitat requirements of many wildlife species, only limited research has addressed the effects of vegetation manipulations on wildlife in southern Arizona and New Mexico.

Expanding the structural diversity of vegetation by controlling shrubs and increasing understory species in strips and patches should increase bird diversity and density. However, such control could decrease deer use by reducing food and cover. Smith (1984) compared bird use of undisturbed, crushed and tebuthiuron-treated creosotebush in Arizona. Black-throated *(Amphispíza bilineáta) and* Brewer's sparrows *(Spizélla bréweri)* foraged opportunistically, which verdins *(Auríparus fláviceps*) avoided crushed plots and vesper sparrows *(Pooècetes gramíineus)* avoided control plots. In the creosote community, chemical treatments opened up small areas, which were used as nesting sites for Cassin's sparrows *(Aimóphila cássinii)* and feeding sites for grass-eating flocks.

Pronghorn are expected to benefit from the increase of forb and grass species following creosotebush or mesquite control.

After treatment of creosotebush or mesquite, the increase of forb and grass species would most likely lead to an increase in use of the treated areas by wildlife species such as pronghorn, mule deer*,* quail, and dove *(Columbína* spp.), which in turn could lead to an increase in the number of hunters using the area. The recreational value would correspond to the availability of animals for hunting or viewing.

The primary recreational activity occurring in the project area is hunting. Mule deer and game birds such as quail and dove are taken during hunting seasons set by New Mexico Department of Game and Fish. A secondary activity occurring in the area is observing nature or watching wildlife. No unique natural features are present.

The application of prescribed fire would have immediate impacts in the form of displacement of many terrestrial species during the actual firing operations. If not conducted during a time period that considers migration, breeding and nesting, and fawning, prescribed fire could decrease the use of the area by wildlife. The impacts would still be short-term as there is similar adjacent habitat available.

Wildlife would be temporarily displaced from the area during the burning and for a short time afterwards. Larger mammals such as coyotes *(Canis latrans)* and mule deer typically leave the treatment area before burning starts as a result of the increase in

human presence on the burn days. Direct kills of smaller mammals as a result of the proposed action would be low, although some could suffocate as a result of the smoke and heat. It may be possible that small mammal populations could decrease temporarily as a result of the loss of cover in would make them more susceptible to predation. The small mammal populations should recover to or above pre-treatment levels as the vegetation recovers.

Birds would be less directly affected by the proposed action, as they are more mobile. A burn that results in a mosaic of burned and unburned areas would benefit the greatest number of bird species by providing increased plant diversity and edge effect.

Prescribed fire can ultimately benefit most ground nesting birds by increasing cover for ground nests which reduces nest predation. The proposed action could improve forage habitat by removing litter, which improves forage areas, and by increasing the composition of forbs, which would increase the quantity and quality of the forage. A negative impact would occur if the timing of the proposed action coincidences with nesting activities. There is the potential that nests would be destroyed during the proposed action; however, the adult birds should be able to escape and renest in unburned areas.

Special Status Species: Habitat suitable for sand dune lizards would be excluded from all treatments except spot treatments of individual mesquite plants. Removal of individual mesquite plants in suitable habitat would stop the invasion of mesquite in these areas and insure that the habitat remains suitable.

Lesser prairie chicken habitat in southeastern New Mexico consists of sand dune shinnery communities dominated by shinnery oak and several species of bluestem *(Andropogon* spp.), grama *(Bouteloua* spp.), and dropseed *(Sporobolus* spp.) grasses. These birds avoid areas of extensive mesquite cover. Mesquite has invaded many sand dune shinnery communities in this area, creating habitat conditions that are no longer suitable for lesser prairie chickens. Following treatment under this proposal, these areas would again be suitable habitat. Much of the mesquite would be removed and the shinnery oak, though temporarily suppressed by the treatment if the chemical is aerially applied, would still be an important part of the habitat and grass nesting cover would be improved. If the chemicals are applied using a spot treatment methodology, adverse impacts to shinnery oak would be minimized.

The Baird's sparrow *(Ammódramus baírdii)* and burrowing owl *(Athéne cuniculária)* may utilize the area on a periodic basis, but due their habitat requirements and the amount of surrounding habitat that would remain like the existing situation, no negative impacts are anticipated.

Cultural: Before authorizing vegetation treatment actions that could affect cultural resources, cultural properties eligible for inclusion in the National Register of Historic Places would be identified and considered through the process outline in the National Historic Preservation Act of 1966 and implemented in 36 CFR 800 and the BLM 8100 Manual series. It is unlikely that cultural artifacts protected by soil or plant cover would be adversely affected by chemical treatments.

Wherever bladed firelines are to be built, a cultural survey would occur prior to blading. Significant archaeological and historic sites would be avoided. Should cultural material be discovered during blading, fireline work would cease until the cultural resource issue is resolved. Significant cultural resources would be protected from further disturbance.

Visual Resource Management: Public land has many different visual values. Visual values are identified through the Visual Resource Management (VRM) inventory and are grouped into four visual resource inventory classes, which represent the relative value of the visual resources. Classes I & II are the most valued, Class III is moderately valued, Class IV is the least valued. The criteria for determining the classes are scenic quality, sensitivity level, and distance zone. Landform, vegetation, water, color adjacent scenery, scarcity and cultural modification area used in determining an area's scenic quality (BLM 1986).

An adverse visual impact is any modification in landforms, water bodies, or vegetation or any introduction of structures that disrupt negatively the visual character of the landscape and the harmony of the basic elements (that is, form, line, color, and texture).

Where areas are treated by methods that could significantly change visual contrast (quality), short-term adverse impacts on visual resources would occur. However, based on standard operating procedures and long range plans, the long-term impacts would be beneficial. The intensity of the impacts would depend on the treatment method and the area where it was implemented. Most of the land considered for the vegetation treatment program in the FEIS is Class IV; therefore, the impacts that might occur from any of the treatment methods would not be as important as in a Class I or II area. Factors that effect the degree of visual contrast area: distance, angle or observation, length of time in view, relative size or scale, season of use, light conditions, recovery time, atmosphere conditions and motion.

Herbicide use reduces the variety of vegetation and may prevent the manifestation of seasonal changes such as spring flowers and fall color in a treated area. Areas treated with herbicides turn brown and contrast with surround vegetation for a short period of time. However, applying herbicides could have the positive visual impact of allowing regrowth of more aesthetically desirable vegetation.

The proposed action would change the color and texture of the landscape by replacing the creosotebush or mesquite cover with grasses and forbs. However, it can be argued whether the visual change is positive or negative. The resulting landscape, as seen from adjacent NM State Road 249, or Aberdeen Road, would still appear natural to the casual observer. To mitigate potential visual impacts, lines between treated and untreated areas should be irregular with no straight edges.

There are no unique natural or man-made features which would interfere with the proposed action or the alternatives. The area has been placed in Visual Resources Management Class III or IV. Both of these Classes allow change in the scenery to occur. The sensitivity of the area is low.

Prescribed burning would have an effect for approximately one growing season while the area is in a blackened condition. After one year the area should return to a normal looking condition.

Social and Economic: A description of the social and economic impacts are discussed on pages 3-119 of the FEIS. Site specific conclusions would be essentially the same.

Social Resources: Many of the social effects of vegetation treatment programs occur as a result of changes in jobs or personal income. Compared with total employment or personal income, employment or income changes resulting from the implementation vegetation treatment may seem small. However, these changes may be important when considered on a local or a site specific basis to individuals who rely on the continued productivity of public lands and employment in vegetation treatment activities for their livelihood.

Direct impacts would occur if an individual's sense of well-being or economic security were affected by BLM's decision on the use or restriction of particular vegetation treatment methods. Indirect effects would occur as a result of economic outcomes of BLM policies and in response to gains or losses of recreational opportunities or access to subsistence activities. All of these impacts, direct or indirect, could affect lifestyles and community stability.

Economic Resources: The direct economic impacts of all of the vegetation program alternatives include increases in both employment and sales of treatment materials. The subsequent increase in personal incomes and revenues would benefit the economy of the area if the employees and equipment needed are acquired within the area.

Indirect Economic Impacts: Indirect economic impacts occur as a result of other actions, such as other vegetation treatments, outside the project area. They are generally difficult to quantify and the incidence of the sort of these impacts is not always clear. Poor range management may result in the death of livestock and wildlife because of ingestion of noxious weeds and poisonous plants.

Human Health: A detailed hazard analysis was conducted for tebuthiuron as proposed here for use in the FEIS (See Appendix E of the FEIS). Additionally, a worst-case analysis was conducted for three of the herbicides use. It has been determined that the worst-case is that someone would get cancer from exposure to herbicides used in the Bureau of Land Management (BLM) Vegetation Treatment Program. The probability of occurrence was projected for two basic populations considered at risk (occupational and general public). The highest probability of cancer for workers in the extreme-case is on the order of one out of 10,000 workers exposed under the lifetime exposure scenario. The highest probability for the general public in on the order of one out of 10 million individuals exposed in the extreme case scenario presented.

B. Impacts of Alternative A – Manual Treatment

Air: This alternative eliminates the potential impacts from herbicides of the Proposed Action.

Soil: Vegetation treatments may affect the physical characteristics of soil directly, alter the abundance and types of vegetation that may shield soil from erosion, or alter the presence and abundance of microorganisms or larger organisms that contribute to overall soil quality.

The effects of this alternative on the soil would be substantial. The increased organic material caused initially by the mesquite and creosote leaves, stems and roots and secondarily by the increased production of grasses and forbs would improve the fertility of the fine sandy loam soil.

Water: This alternative eliminates the potential impacts from herbicides of the Proposed Action. This alternative would not increase peak flows because plant water use would be little affected. Stream nutrients and sediment loads would not increase because litter and duff would be left intact.

Vegetation: Vegetation treatments would have beneficial and adverse effects on terrestrial vegetation within the treatment area. Target vegetation in treated areas would be directly affected. Non-target vegetation would not be affected.

Livestock: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Due to longer time frames which are required for manual treatments, alternate locations may be needed for the displaced livestock. Impacts to livestock grazing management (rest until the treated area recovers, usually two growing seasons) would be the same as the Proposed Action.

Invasive, Non-native Species: African rue may be spread by manual treatment if normal care is not taken to clean all equipment being used in and around infested sites. Salt cedar would resprout after manual treatment if the root crown is not removed. If the same treatment method is applied to the salt cedar as is proposed for creosotebush or mesquite, control of salt cedar would be affected.

Wildlife: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Manual treatment, however, would negatively affect those species that depend on the target plants for food or cover. The long timeframes required for manual treatment would disrupt wildlife use of the habitat during treatment.

Special Status Species: Impacts would be similar to those in the Proposed Action. There would be extended disruption of habitat use during treatment.

Cultural: Before authorizing vegetation treatment actions that could affect cultural resources, cultural properties eligible for inclusion in the National Register of Historic Places would be identified and considered through the process outline in the National Historic Preservation Act of 1966 and implemented in 36 CFR 800 and the BLM 8100 Manual series. It is unlikely that cultural artifacts protected by soil or plant cover would be adversely affected by manual treatments.

Recreation: Recreational aspects should not change with the proposed action.

Visual Resource Management: Impacts would be similar to those in the Proposed Action.

Cave/Karst: There should be no effect by using manual methods of treatments within the proposed area.

Social and Economic: The direct and indirect social and economic impacts of manual treatment would be essentially the same as the Proposed Action.

Human Health: Under this alternative, risks of public and worker health effects from herbicides would be eliminated. Risks to workers, however, from manual or mechanical treatment would increase.

C. Impacts of Alternative B – Large Scale Mechanical Treatment

Air: This alternative eliminates the potential impacts from herbicides of the Proposed Action. The impacts of this alternative, however, would be increased dust particles during the treatment itself as well as dust as the result of wind erosion until the grasses and forbs re-establish themselves in the treated areas,

Soil: Vegetation treatments may affect the physical characteristics of soil directly, alter the abundance and types of vegetation that may shield soil from erosion, or alter the presence and abundance of microorganisms or larger organisms that contribute to overall soil quality.

The effects of this alternative on soil would be substantial. Removing mesquite and creosote by this method also removes grasses and forbs, resulting in large areas of bare soil. This alternative would result in an increased risk of soil erosion due to wind and rain until the grasses and forbs re-establish themselves in the treated area.

Water: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Precipitation runoff would increase and an associated increase in stream volume and peak volume. Loss of vegetation cover would result in increased erosion potential and subsequent sediment loads.

Vegetation: Vegetation treatments would have beneficial and adverse effects on terrestrial vegetation within the treatment area. Target and non-target vegetation in treated areas would be directly affected.

Livestock: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Due to longer time frames which are required for mechanical treatments, alternate locations may be needed for the displaced livestock. Impacts to livestock grazing management (rest until the treated area recovers, usually two growing seasons) would be the same as the Proposed Action.

Invasive, Non-native Species: African rue may be spread by mechanical treatment if normal care is not taken to clean all equipment being used in and around infested sites. Salt cedar would re-sprout after mechanical treatment if the root crown is not removed.

If the same treatment method is applied to the salt cedar as is proposed for creosotebush or mesquite, control of salt cedar would be effected.

Wildlife: Impacts would be similar to those of Alternative A.

Special Status Species: Impacts would be similar to those in the Proposed Action.

Cultural: Mechanical treatment could damage archeological and historic sites. In order to avoid damaging sites, cultural inventory surveys would need to be conducted prior to project implementation in order to locate and avoid eligible and potentially eligible sites. Buried sites discovered by mechanical treatment may also increase the possibility of artifact theft due to site exposure. Performing cultural surveys to mitigate these impacts would add substantially to the cost of the project.

Cave/Karst: In medium karst potential the area should be reviewed for cave/karst resource potential by the Roswell Field Office Outdoor Recreation Planner. If areas of medium cave karst locations are found the area should be avoided by heavy equipment as described in the proposed action. There should not be any problems with the low karst potential areas.

Recreation: There would be a decrease in hunting potential when equipment is within the area as well as after heavy grubbing of plants occurs. This should be a temporary affect and would not be long lasting. Hiking and driving for pleasure would not be affected by the proposed action.

Visual Resource Management: Impacts would be similar to those in the Proposed Action.

Social and Economic: The direct and indirect social and economic impacts of manual treatment would be essentially the same as Alternative A – Manual Treatment.

D. Impacts of the No Action Alternative

The No Action Alternative avoids the impacts of herbicide applications and prescribed fire. Therefore, under the No Action alternative present conditions would not significantly change. The area would primarily remain in a status quo condition with the area dominated by mesquite and its present effects. Mesquite would continue to encroach and increase to the detriment of the native habitat and the species that rely on that habitat. Endangered species occurrence as well as mule deer, pronghorn and quail populations would remain unchanged. Lesser prairie chicken habitat would continue to be lost, as mesquite invasion continues. No increase of forage or stabilization of soil would occur. Expansion of existing blowout areas would occur under the no action alternative. No increase in use by recreationists would occur. Movement towards the goals of Desired Plant Community or improvement in public land health would not occur.

E. Mitigation Measures and Residual Impacts

Mitigation Measures

Any project involving herbicides would follow the policies, standards and practices listed in Appendix 9, Treating Vegetation with Herbicides, of the 1997 Roswell RMP. In addition to the mitigation measures listed in the Proposed Action, the following measures would also apply:

- In areas of Medium cave/karst potential the area would be reviewed by the Roswell Field Office Outdoor Recreation Planner to determine if there is cave or karst features within the area. If cave/karst features are found, heavy equipment should not be used within these areas and surface disturbance shall be kept to a minimum within these areas.

- Livestock numbers would not increase as a result of any of the treatments covered in this analysis. The livestock operator must demonstrate to BLM staff that any net increase in animal unit months (AUMs) is the direct result of the livestock operator's ability to manage livestock in balance with watershed capacity to provide forage, maintain livestock distribution and proper grazing use to restore rangeland health prior to any increases in authorized increases in animal numbers.

- BLM would ensure that the agreed upon level of cultural inventory is completed prior to implementation, and would protect sensitive areas using buffer zones, hand treatment of vegetation, removal of heavy fuels or other actions agreed to under the provisions of the Protocol Agreement between the New Mexico Bureau of Land Management and New Mexico State Historic Preservation Officer. These procedures would ensure compliance with the National Historic Preservation Act. The appropriate mitigation measures may be implemented after consultation with New Mexico State Historic Preservation Officer.

- Treatment would be conducted to avoid the nesting season and other times of the year when loss of cover would be critical to wildlife; for example reproductive periods (from April to June).

- Monitoring studies would be conducted to determine those areas that meet or exceed the treatment threshold. Post-treatment monitoring would be conducted to evaluate the effectiveness of treatments.

Residual Impacts: Implementation of the proposed action or of the alternatives of either a different rate of chemical or different amount of acreage would all have the same potential for unavoidable adverse environmental impacts. They are as follows:

- Short-term reduction in air quality from dust and engine emissions resulting from the equipment being used in the application of the herbicide.

- Short-term change in chemical composition of the uppermost soil layers due to the change in abundance of organic matter.

-A temporary increase in fire hazard from waste material (dry vegetation) left on the ground after treatment.

-Short-term decrease in habitat for wildlife species.

V. COST ANALYSES

This EA is tiered to the Vegetation Treatment on BLM Lands in Thirteen States Final EIS (FEIS) of May 1991. The Record of Decision for this document states:

> "Land treatments proposed for livestock forage improvements would be subject to a cost benefit analysis to ensure total benefits gained would equal or exceed the cost of treatments. The economic analysis would identify the most economical treatment practice."

As stated elsewhere in this document, the stated purpose of this project is not livestock forage improvements and no increase in livestock numbers would accompany treatments analyzed in this document. Therefore, a cost-benefit analysis is not necessary, however, this EA would identify the estimated costs of treatments.

This EA has identified 91,000 acres, (approximately one-half the public land acres within the project area) as the upper limit of public land acres that would be treated within the Pecos Uplands landscape. Actual treatment acres, regardless of the method used, is dependent on the future budget BLM would receive to carry out these types of projects.

Table 3. Estimated Treatment Costs

Alternative		Estimated Cost Per Acre	Possible Acres Treated	Estimated Total Cost
Proposed Action	Chemical	$30	115,000	$3,450,000
A. Manual Treatment		$450	115,000	$51,750,000
B. Large Scale Mechanical Treatment		$300	115,000	$34,500,000

VI. CUMULATIVE IMPACTS

A cumulative impact is defined in 40 CFR 1508.7 as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The analysis of cumulative impacts focuses on the geographical area defined as the set of BLM-administered allotments within the Pecos Uplands as illustrated on the attached maps and listed under Table 2. The specific resources being impacted are limited to those that are most important in terms of impacts resulting from remedial actions

needing to be implemented to improve current environmental conditions. The proposed action is the treatment of invasive mesquite within a grassland community type using a combination of methods to reach the goals and objectives for the restoration of the native grassland community. Environmental considerations are presented to mitigate impacts and include standard operating procedures for vegetation treatments, as well as specific design features that would be developed on a case-by-case basis for individual treatments and environmental conditions and resource concerns warrant.

The health, viability and sustainability of grassland resources within the project area has been impacted by land use activities that have occurred over the last 150 years. Impacts from open-range livestock grazing in the last century are still being addressed by the Bureau of Land Management. The impacts of such past practices coupled with climatic conditions such as long-term drought periods has encouraged the encroachment of brush species such as mesquite, broom snakeweed, yucca and cactus species, saltcedar and other non-native plant species (noxious weeds) that increase when rangeland conditions deteriorate. The suppression of range fires has also contributed to the increase in brushy species and deterioration of rangeland health. On its own, these rangelands cannot revert back to the once pristine grassland prairie ecosystems of the past, and prior to man's activities, without resource management actions to improve soil and vegetation resources.

Past vegetation treatments within the project area have occurred. BLM records show 11 other chemical treatment projects totaling 33,000 acres in the project area in the past 20 years. Collectively, these treatments account for about eight percent of the total area, regardless of land status, or about 14 percent of federal lands.

Other major resource uses that have been occurring within the project area, and expected to continue, include oil and gas development and rights-of-way construction. These legitimate activities under BLM's multiple use mandate are nevertheless cumulative impacts to grassland ecosystems as well. The reasonable and foreseeable development scenario for oil and gas and rights-of-way development, found in the 1994 Draft Roswell RMP, indicates that in the Pecos Uplands approximately 10 new wells would be drilled per year and approximately four wells would be plugged and abandoned.

Livestock grazing is expected to continue in the project area but allocation of forage resources above current uses is not expected to occur. As markets for beef production fluctuates, so does actual livestock use on federal land. As drought conditions and effects are seen on the landscape, this natural event also affects livestock grazing on public lands. Livestock numbers are expected to fluctuate following market conditions and rangeland health, with a decrease in stocking rate following a decline beef prices in the market and/or in rangeland vegetation production from lack of precipitation.

In the long term, the treatment of up to 91,000 acres would most likely occur in stages spanning several years to allow for project planning and optimum treatment prescriptions. This "staggering" of site-specific projects reduces the amount of direct impacts to resources and buffers the cumulative impacts of repeated actions over the landscape. Individual treatments could range from 500 acres up to 1,000 acres in size, and possibly larger for prescribed fire activities. The size and number of treatments

would be, in part, determined by economies of scale, with the costs reduced by efficiently implementing control over the project area. The degree of cumulative impacts would increase as the size of the individual treatments increases.

All authorized activities which occur on federal land can also take place on private and state lands. It is expected that additional land treatments would occur on other private and state lands through either private funding or through programs through the National Resource Conservation Service (NRCS). The amount of specific treatments that may be proposed on other lands within the project area is not known.

The very nature of the proposed action is to improve the grassland community while limiting and reducing impacts to other resources and uses by design, it is not a surface disturbing activity such as those associated with developments. Direct and indirect impacts of the proposed action to resources are adequately addressed above. Improving the grassland community within the project area has the effect of sustaining the viability and health of grasslands in the long term, and countering other ongoing and foreseeable impacts generated by activities such as oil and gas development and rights-of-way which tend to fragment habitat.

In addition to the proposed action for the Pecos Uplands, there are three similar-in-action project areas to receive vegetation manipulation projects to enhance current rangeland conditions. These are the Hondo, Pecos Uplands and East Chaves project areas, all located within the Roswell Field Office area. These three additional areas are disjunct and support a different type of grassland ecosystem with differing site conditions. These are mentioned here in the context of cumulative impacts of grassland restoration efforts on a large scale. As pointed out, site conditions differ and a reason for the development of additional environmental assessments covering proposed vegetation manipulation projects in their respective areas. As a matter of disclosure, the collective acreage for treatment of public land for this grassland restoration endeavor is about 310,000 acres of federal land, or about 21 percent of all public land within the Roswell Field Office.

Overall, the cumulative impacts associated with the proposed action are not expected to be an additive negative impact to the environment but rather a beneficial additive impact to various resources over the entire landscape, given the mitigation, standard operating procedures and case-by-case project design and implementation. As mentioned, the degree of cumulative impacts may vary based on the size of individual treatments. In general, long term vegetation and soil health would benefit the grassland ecosystem and wildlife species dependent on this habitat type, custom and culture would be sustainable from enhance rangeland conditions, other land use impacts would be buffered, or balanced with grassland restoration efforts. Sustaining the projects would require monitoring efforts to detect appropriate livestock utilization levels, modification of future projects to reach objectives, and other resource use restrictions as needed to ensure the longevity of the restoration efforts. The conclusion of impacts to other resource values from mesquite control would not be significant are discussed in detail in Section IV of the EA.

VII. COMMITMENT OF RESOURCE

The proposed action is a non-reversible and irretrievable commitment of the rangeland resource.

VIII. SUMMARY

The results of the proposed action would change the plant and animal communities of the treatment area. The proposed action would result in beneficial effects to the soil, water and animal life. The treatment of a small area as proposed would not affect the environment as a whole but effects would be site specific.

IX. PERSONS OR AGENCIES CONSULTED

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Howard Parman, planning and environmental coordinator
Richard Hill, environmental protection specialist
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Melvin Moe, wildlife biologist
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John Spain, rangeland management specialist
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Joseph Navarro, rangeland management specialist
Irene Gonzales, Reality Specialist
Jerry Dutchover, Geologist

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APPENDIX A

Chemical Labels and MSDS Information

APPENDIX B

Best Management Practices

APPENDIX B
Best Management Practices

Vegetation treatments within the Roswell Field Office would utilize the following best management practices (BMPs) for chemically or mechanically treatment areas:

- The specific treatment areas would be evaluated on an individual, site specific basis. For any treatment project both pre- and post-treatment monitoring data would be collected.
- Only herbicides approved for use by the Environmental Protection Agency (EPA), BLM, and the State of New Mexico would be applied on public land.
- Application of herbicides may be made via either aerial or ground methods.
- Aerial application of the herbicide would be conducted when the correct phenological stage of target plant growth occurs; generally between the first of June and the end of September.
- Ground applications would be made at any time of the year, except when the ground is frozen.
- Treatments are conducted in such a manner to reduce straight edge lines, and contain areas or islands of untreated vegetation left for the preservation of habitat important to the maintenance of existing and future populations of game and non-game animals.
- Treatments would serve to create a regional mosaic within the landscape.
- Site-specific mitigation and design features would be incorporated in the Administrative Decision document.
- Appendix 9 of the Roswell RMP outlines the policies, standards and practices to be used on public land in the Roswell Field Office when treating vegetation with herbicides. These requirements are derived from BLM policy, the Final EIS on Vegetation Treatment on BLM Lands in Thirteen Western States, decisions made in Roswell Resource Area Land use plans, and mitigations developed through environmental assessments.
- The applicable federal regulations concerning the storage and disposal of herbicides and herbicide containers would be followed. These are described in the Environmental Protection Agency "Regulations for Acceptance and Procedures for Disposal and Storage," Federal Register May 1, 1974, pages 15236 through 15241. This notation can be found on the label of each herbicide.
- The response of vegetation to treatment would be monitored by methods established prior to treatment. Onsite evaluation of herbicide effectiveness and resulting secondary succession would be conducted. Data gathered would be used to improve the brush control process.
- A resumption of livestock grazing would be made with the consultation of the grazing permittee and BLM.
- Considerations for wildlife habitat, watershed conditions and livestock operations would be factored into each project. These may include leave out areas, timing of treatment and additional management actions after treatment.
- Mechanical methods of treatment would be used in locations where herbicide application is not appropriate, such as floodplains, riparian areas and some sites within Areas of Critical Environmental Concern (ACECs).
- Before surface disturbing mechanical treatments are allowed on any site, surveys for the presence of cultural resources would be conducted. Cultural sites discovered by these surveys would be avoided our left out of the treated area.
- For any site proposed for pesticide (herbicide) treatment, the potential for groundwater contamination would be evaluated with the Environmental Protection Agency (EPA) rating system, DRASTIC (Aller et al. 1985). If the site proposed for treatment has a

DRASTIC index greater than 100, it has a moderate to high potential for groundwater contamination, and would require a more detailed analysis prior to a decision being made on the proposed treatment. Factors that would be studied further include: pesticide solubility, mobility, speciation, and degradation, and highly localized recharge areas. A DRASTIC analysis for the entire Roswell Field Office Area has not been performed or incorporated into this EA. Therefore, a detailed DRASTIC analysis would be prepared for all pesticide treatment projects developed under this EA prior to pesticide treatment project implementation and prior to a decision being made on each of the proposed pesticide treatments. The Drastic Analysis for each proposed pesticide treatment would be included with the Documentation of Land Use Plan Conformance and National Environmental Policy Act (NEPA) Adequacy (DNA) review and decision document. A DNA would be prepared for each proposed herbicide treatment project.

The following photographs depict areas within Turkey Track Grassland Restoration project.

Figure 1: Illustration of area which would not meet criteria

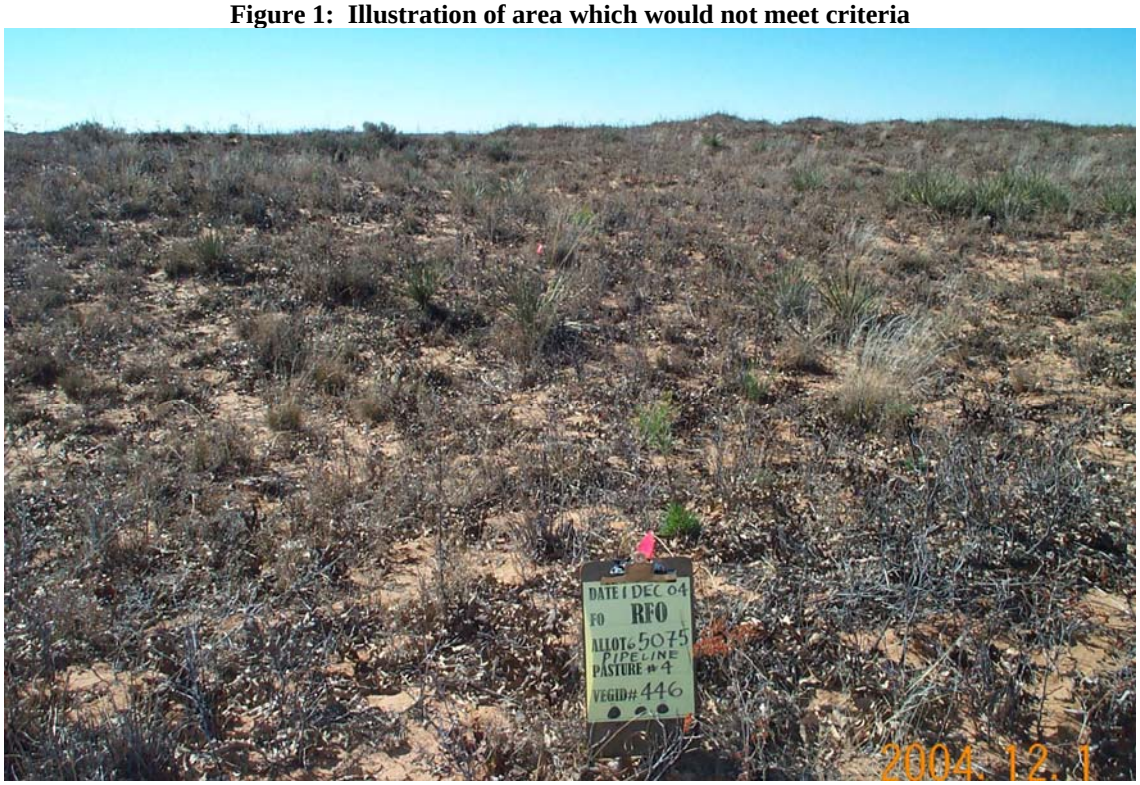

Figure 2: Illustration of potential mesquite treatment by either Mechanical, Manual or

Figure 3: Illustration of potential mesquite treatment by aerial application of Herbicide

Figure 4: Illustration of potential mesquite treatment by combination of aerial application of Herbicide and prescribed fire

Figure 5: Illustration of potential Creosote treatment by combination of aerial application of Herbicide